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Award Number: DAMD17-00-1-0669

TITLE: Cellular and Molecular Changes of the Respiratory System in Rats Exposed to ACM Combustion

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REPORT DATE: November 2001

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 074-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	November 2001	Annual (1 Oct 00 - 1 Oct 01)

4. TITLE AND SUBTITLE
Cellular and Molecular Changes of the Respiratory System in Rats Exposed to ACM Combustion

5. FUNDING NUMBERS
DAMD17-00-1-0669

6. AUTHOR(S)
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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

12b. DISTRIBUTION CODE

13. Abstract *(Maximum 200 Words)* *(abstract should contain no proprietary or confidential information)*

The use of ACM in the military and private sector is increasing. Yet little is known concerning the toxicity of the byproducts of ACM combustion. Recently, as a result of accidents and mishaps, significant interest has developed regarding the potential health hazards associated with the combustion of ACM and the release of toxic gases, vapors and particles. We hypothesize that exposure to such atmospheres result in cellular and molecular alterations that ultimately may lead to lung injury. Smoke inhalation is one of a number of conditions that can result in the development of adult respiratory distress syndrome (ARDS), a severe form of lung injury that carries with it significant mortality. We propose to investigate the cellular and molecular changes of the respiratory system in rats exposed to ACM combustion atmospheres. By identifying the critical pathways necessary for the development of lung injury from ACM combustion atmospheres, we could apply that knowledge toward new and improved methods of treatment for lung injury including ARDS. In addition, by investigating the cellular and molecular changes prior to lung injury, we may be able to identify biomarkers that would be early predictors of those individuals at risk for progression to lung injury following exposure.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Lung, BALF, Cytokines, Smoke, PMNs, Inhalation	6
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

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Introduction

This research involves characterization of the pulmonary toxicity associated with exposure to combustion atmospheres of advanced composite material. Using rats as the animal model, we determine the changes to the respiratory system defining the cellular and molecular alterations which preclude lung injury. By identifying the critical pathways necessary for the development of lung injury in this model, we can apply this knowledge toward the development of new and improved methods of treatment.

Body

To date, the exposures necessary to complete the control groups have been completed. The animals have been sacrificed and the lung lavages completed. Cell counts and identification have also been performed. Unfortunately, due to the extreme difficulty in obtaining the composite material, the combustion groups have not been completed. Only recently have we been able to obtain composite material thereby putting the project approximately 6 months behind schedule. Analyses cannot be performed until the smoke groups are completed since the comparison is between controls and combustion groups. Work remaining to be completed for year 1 is as follows:

Expose rats to combustion atmospheres with interim sacrifices at 1,3,7,21 and 156 days. Run cytokine and protein analyses for comparison between controls and composite groups. Compare cellular changes as well as histological changes. This work will be completed in the early part of year 2 and should have minimal impact on the scheduled work designated for year 2.

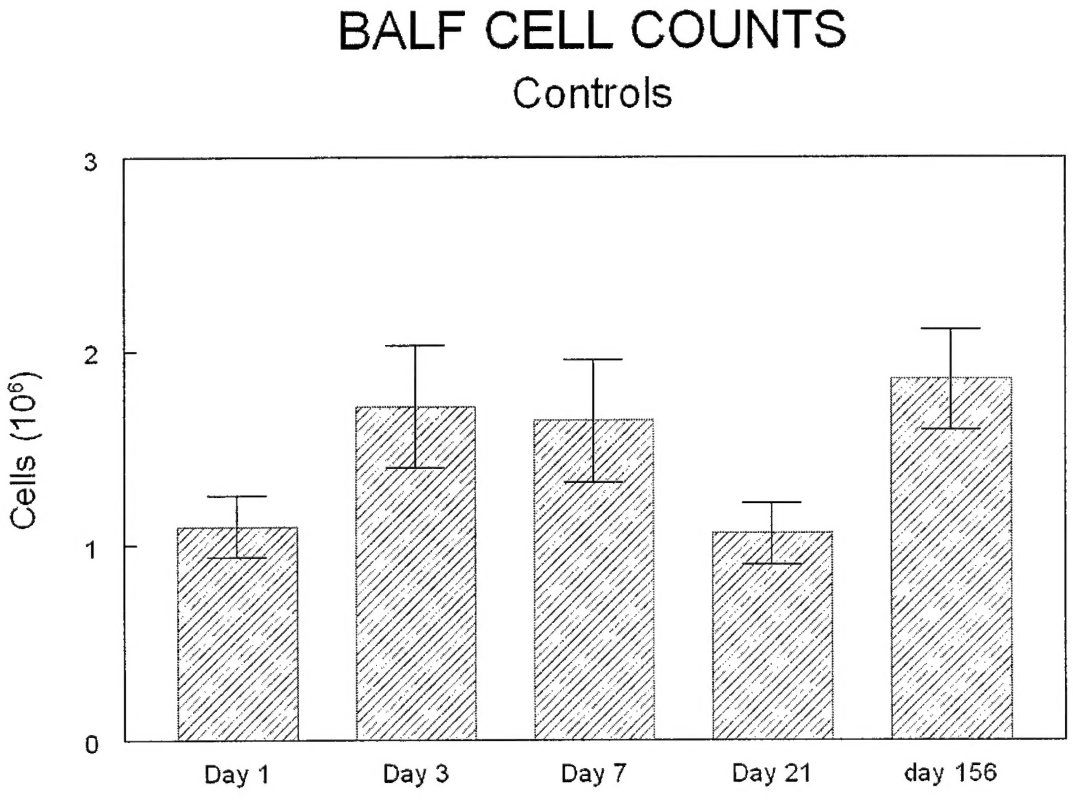
Key Research Accomplishments

Control group exposures are finished.

Reportable Outcomes

BALF Cell Differentials

Group	Macrophages	PMNs	Lymphocytes
Controls Day 1	98.750 ± 0.277	0.650 ± 0.172	0.600 ± 0.120
Controls Day 3	98.575 ± 0.301	0.925 ± 0.245	0.275 ± 0.065
Controls Day 7	97.850 ± 0.313	1.500 ± 0.233	0.657 ± 0.162
Controls Day 21	97.950 ± 0.640	1.375 ± 0.569	0.714 ± 0.114
Controls Day 156	98.250 ± 0.250	1.250 ± 0.269	0.500 ± 0.107



Represents the mean and SE for each group.

Conclusions

Normal cell counts and differentials within the control groups.

References

None.

Appendices

None.